Volunteer Lake Assessment Program Individual Lake Reports

OTTERNICK POND, HUDSON, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	2,752	**Max. Depth (m):**	3.7	**Flushing Rate (yr^{1}):**	20.5
Surface Area (Ac.):	34	**Mean Depth (m):**	1.9	**P Retention Coef:**	0.4
Shore Length (m):	1,800	**Volume (m^{3}):**	261,500	**Elevation (ft):**	170

TROPHIC CLASSIFICATION

Year	Trophic class
1979	EUTROPHIC
1998	EUTROPHIC

KNOWN EXOTIC SPECIES

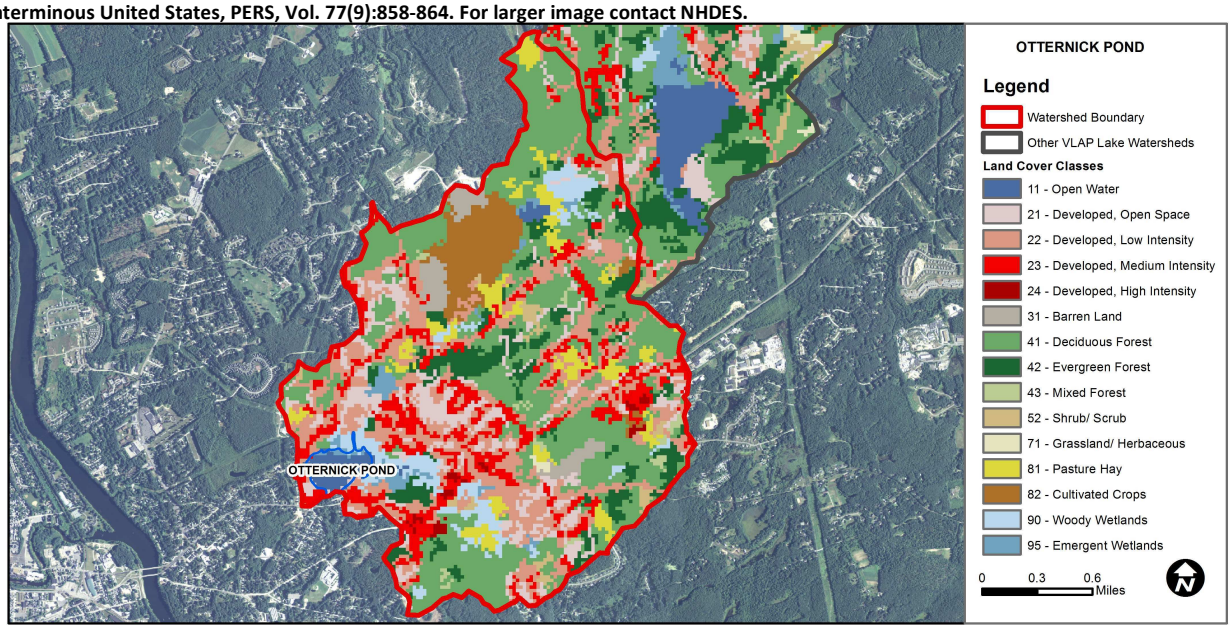
Variable Milfoil
Fanwort

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Cautionary	There are < 10 samples with 1 exceedance of criteria. More data needed.
	Dissolved oxygen satura	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	No Data	No data for this parameter.
	Chlorophyll-a	Bad	There are >10% of samples (minimum of 2), exceeding indicator with one or more samples considered large exceedance.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	1.74	Barren Land	2.35	Grassland/Herbaceous	0.13
Developed-Open Space	8.68	Deciduous Forest	30.87	Pasture Hay	5.06
Developed-Low Intensity	19.2	Evergreen Forest	7.43	Cultivated Crops	4.99
Developed-Medium Intensity	11.1	Mixed Forest	0.71	Woody Wetlands	4.48
Developed-High Intensity	0.63	Shrub-Scrub	1.15	Emergent Wetlands	1.53

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Otternic Pond, Hudson

2014 Data Summary

Observations and Recommendations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were fairly low in May and June and then increased greatly in July, August and September and were indicative of an algal bloom. A cyanobacteria warning was issued for Otternic Pond in 2014 due to the presence of a potentially toxic cyanobacteria bloom or surface scum. Historical trend analysis indicates highly variable chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Deep spot and tributary conductivity and chloride levels remained elevated and much greater than the state medians. This is indicative of the urbanized watershed. Historical trend analysis indicates relatively stable epilimnetic (upper water layer) conductivity with moderate variability since monitoring began.
- **Total Phosphorus:** Deep spot and tributary phosphorus levels were within an average range for each station and increased from May through July. By August and September, water levels were low and phosphorus levels were greatly elevated at each station indicative of and contributing to the cyanobacteria bloom. Historical trend analysis indicates stable epilimnetic phosphorus since monitoring began.
- **Transparency:** Transparency was good May through June and decreased from July through September during the cyanobacteria bloom. Average transparency was stable with 2013 and historical trend analysis indicates relatively stable transparency with moderate variability since monitoring began.
- **Turbidity:** Deep spot and tributary turbidity levels were average in May and June, and elevated from July through August during low water levels and the cyanobacteria bloom.
- **pH:** Deep spot and tributary pH levels were sufficient to support aquatic life and within the desirable range of 6.5—8.0 units. Historical trend analysis indicates highly variable epilimnetic pH since monitoring began.
- **Recommended Actions:** Conductivity and chloride levels are consistently elevated and much greater than the state medians. Educate and encourage local road agents, winter maintenance companies, and watershed residents on best practices for winter de-icing. The UNH Technology Transfer Center's Green SnowPro Certification program is a great course to take. The pond has periodically experienced cyanobacteria blooms that have the potential to produce toxins that could harm domestic animals, livestock and even humans if ingested. Excess nutrients cause elevated cyanobacteria and algal growth. Nutrients, such as phosphorus, can enter the pond through stormwater runoff. The increased frequency and intensity of storm events, combined with the cyanbacteria blooms, highlights the importance of educating watershed residents and lawn maintenance companies on utilizing phosphate free fertilizers as well as implementing stormwater best management practices on their properties. DES' "Homeowner's Guide to Stormwater Management" is a good resource.

Table 1. 2014 Average Water Quality Data for OTTERNIC POND

Station Name	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
						NVS	VS		
Epilimnion	38.1	10.69	76	362.0	34	2.28	2.13	2.60	7.33
Hypolimnion				360.0	43			3.48	7.01
Benson Inlet			78	368.6	30			3.57	7.33
Glover Inlet			74	352.2	27			2.79	7.25
Outlet			79	358.2	30			2.41	7.53

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data moderately variable.	Chlorophyll-a	Stable	Trend not significant; data highly variable.
pH (epilimnion)	Stable	Trend not significant; data highly variable.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data show low variability.